from any questions as to how best to deal with the gust problem, the study of the forced oscillations of an aeroplane is a problem proposed for solution many years ago, which has to be solved sooner or later in the development of the aeroplane, and the sooner the better. Of course, the treatment is limited to the consideration of small disturbances, but we believe it was Mr. Bairstow who, in the earlier days of his experiments, pointed out that a theory so formed might give useful approximations for practical purposes, just as our knowledge of the pendulum was largely based in the first instance on the study of oscillations of small amplitude. It will be seen that both longitudinal and lateral disturbances are considered, although the inconvenient notation renders it a little difficult to know what is longitudinal and what lateral, or even whether the aeroplane is supposed to be flying forwards or backwards. An alternative method of treating gusts has been developed and worked out by Mr. Brodetsky in this country, although only his first paper has yet appeared in print.

The value of mathematical work of this kind has been called in question by certain meteorologists who have claimed that theirs was the proper method of solving the problems of aviation. A study of the present collection of papers, however, shows that while meteorological investigations are required to ascertain the conditions under which flights are made, it is necessary to resort to very long, hard mathematical calculations in order to ascertain *how* these conditions can be met in the construction of a flying machine. Of course, work such as that of Prof. Wilson requires developing from the experimental side, but the mathematics must be done previously. G. H. B.

NOTES.

The present position of nitrogen fixation in this country was stated in the House of Commons on May 2 by Mr. Kellaway, Parliamentary Secretary to the Ministry of Munitions, in reply to a question by Sir William Beale. The various proposals for fixing nitrogen have been examined in detail by the Nitrogen Products Committee of the Munitions Inventions Department, and, as a result, intensive research has been concentrated upon the Haber process. A research staff composed entirely of young British scientific workers has accumulated the knowledge requisite to the translation of the vague outlines of this process of ammonia synthesis, as revealed in the patents of the German industrial concerns, into a commercially practicable process. This has involved two years of unremitting laboratory research, during which period numerous departmental patents have been taken out for improvements in ammonia synthesis, as well as in the subsidiary branches of the problem, such as hydrogen manufacture. These patents are held in the names of the members of the research staff, and are assigned to the Secretary of State for War. The research work of the staff of the Munitions Inventions Department is now far advanced, so that the results have been placed at the disposal of the Explosives Department for application on a factory scale. The manufacturing operations will be conducted at present for war purposes, the production of synthetic ammonia being applicable to the manufacture of explosives, as well as to the production of ammonium sulphate for agriculture. The results of the research work on synthetic ammonia have not been made public, but may be communicated confidentially to concerns proposing to erect plant under financial arrangements approved by the Treasury. The availability to manufacturers of the general research work of the staff of the Munitions Inventions Department is now being considered by committees representing the several departments concerned.

The Gas Traction Committee, appointed in November last to consider the employment of coal-gas as a substitute for petrol and petroleum products in motors, its general safety, and conditions for use, has issued an interim report (H.M. Petroleum Executive, price 1*d.*). This deals chiefly with the present use of gas, mainly at low pressures, in suitable fabric bags; the work is to be continued to cover its use under higher compressions when the necessary appliances and plant are obtainable. The Committee is satisfied that gas can be efficiently, safely, and promptly substituted for motor spirit (only two minor accidents have been reported). Two hundred and fifty cubic feet are considered equivalent to one gallon of petrol, so that gas at 4*s.* per 1000 cub. ft. is equivalent in cost to petrol at 1*s.* per gallon. No restrictions, except in so far as the shortage of coal or other war conditions may demand, should be imposed on the use of gas in suitable containers. A specification for the bags is given; the material should be two-ply diagonally doubled, and proofed with 6 oz. per square yard of proofing containing 90 per cent. of high-class rubber, this being vulcanised by the hot process. The permeability of prepared fabric to hydrogen must not be more than 10 litres per square metre per twenty-four hours (0·3 cub. ft. per square yard per twenty-four hours). The working life of such containers would normally be eight months. Top ventilation should be provided in any garage, and a container should be completely deflated after standing idle for two weeks. For use under higher compression it is undesirable that semi-rigid containers of rubbered canvas should at present be charged to a greater gas pressure than 90 lb., or be of greater internal diameter than 4 in. Encouragement should be given to the construction of semi-rigid containers of rubber and woven wire up to a working pressure of 300 lb., and it is considered desirable to encourage experiments with rigid metal cylinders working up to 1800 lb., particularly in connection with their application to motor-omnibus use and for the transport departments of municipal authorities.

A letter to the Press on the subject of food crops and the protection of birds, recently issued by the Royal Society for the Protection of Birds, directs attention to the serious diminution in the numbers of our resident insectivorous birds, due to the severe winter of 1916–17, and also to the widespread destruction of birds and eggs, which is a cause of grave anxiety at the present time. That everything possible should be done to protect and preserve such species is beyond dispute. As the signatories of this letter point out, all are agreed that insect-eating and vermin-eating species of wild birds are invaluable to man. Further, the farmer and fruit-grower have everything to gain by responding to the present appeal to take the matter up promptly with the view of checking the destruction of these birds and their nests and eggs. Plagues of various species of injurious insects have already been reported from different parts of the country, and but for the services of our resident and migrant insectivorous birds these would each year grow worse. As it is, they already inflict very serious losses, and unless there is a large increase in the number of beneficial birds there is always the possibility of their gaining the ascendancy and causing widespread destruction to our home-grown food supplies. At a time like the present, when every acre of food is almost priceless to the country, our agricultural, gardening, and allotment societies and associations might do much to conserve a highly beneficial factor in successful production the importance of which it would be difficult to over-estimate.

BY the death of Dr. Joseph Deniker on March 18, France has lost one of her most distinguished anthropologists. Dr. Deniker, who was in his sixty-seventh year, was born in Russia, and commenced his student's career in Petrograd. Later he went to Paris as a student of anthropology, where his special abilities were quickly recognised, and he was given a permanent place in the school of his adoption. The research which he published in 1885 on "The Anatomy and Embryology of the Anthropoid Apes" is an example of how investigations of that kind should be made. He is best known for the work he did relating to the classification of human races. From 1880 until his death Dr. Deniker gathered data from all trustworthy sources relating to the physical characters of inhabitants of every quarter of the globe, with the view of building up a natural classification of human races. There are few peoples he had not investigated personally. Some of the results of that labour can be seen in "The Races of Man," which he wrote for the Contemporary Scientific Series in 1900. He focussed his attention particularly on the races of Europe, and his various publications dealing with the racial types and the distribution of these types amongst the various nationalities of Europe constitute the most trustworthy sources of information concerning the ethnology of modern Europe. Dr. Deniker also made contributions to our knowledge of the cultural side of anthropology. He held the post of chief librarian to the Natural History Museum in Paris, and did much for the bibliography of scientific literature. He acted as secretary for France in the compilation of the International Catalogue of Scientific Literature. In 1895 the Royal Anthropological Institute of Great Britain and Ireland made Dr. Deniker an honorary fellow, and ten years later invited him to give the Huxley memorial lecture—the highest honour at its disposal.

AT a general meeting of the members of the Royal Institution held on May 6, the following vice-presidents were elected:—Dr. H. E. Armstrong, Sir Wm. Phipson Beale, Bart., the Hon. R. C. Parsons, the Rt. Hon. Lord Wrenbury, the Rt. Hon. Lord Rothschild, Sir James Crichton-Browne (treasurer), and Col. E. H. Hills (secretary).

WE learn from the *British Medical Journal* that the Institute of France has decided to award the Osiris prize this year. The prize is of the value of 4000*l.*, and was founded for the recognition of the most important discovery or work in science, letters, arts, industries, or generally anything for the public benefit. It has been held in abeyance since the beginning of the war.

AN informal meeting of the fellows of the Chemical Society will be held at Burlington House on Thursday, May 16, after the conclusion of the business of the ordinary scientific meeting. Messrs. Adam Hilger, Ltd., will give a demonstration of their method of determining the best temperature at which to anneal glass, and specimens of apparatus will be exhibited by the Dunlop Rubber Co., Messrs. Fuerst Bros., Townson and Mercer, Ltd., and the Scientific Supplies Co.

THE Iron and Steel Institute has awarded 100*l.* from the Carnegie Research Fund to Mr. G. Patchin to enable him to pursue research on "Semi-Steel and its Heat Treatment"; to Mr. J. N. Kilby for research work on "The Basic Open-hearth Process of Steel-making in all its Branches"; to Mr. S. L. Hoyt for the study of "The Foreign Inclusions in Steel, their Occurrence and Identification"; and to Mr. J. A. Vanden Brock for research work on "The Elastic Properties of Steel and Alloys."

THE inaugural meeting of the Gilbert White Fellowship was held on Saturday, April 20. Resolutions proposing the formation of the fellowship and the adoption of its rules were proposed and carried unanimously. Then followed the election of Dr. William Martin as the first president. The list of vice-presidents includes the names of Mr. E. W. Holmes, Mr. W. H. Mullens, Sir David Prain, Prof. G. S. Boulger, Miss Gulielma Lister, Mr. A. W. Oke, and Miss Willmott. The honorary secretary is Mr. W. M. Dunton, 18 Crockerton Road, S.W.17.

THE council of the Royal Society of Edinburgh has awarded the Keith and Neill prizes as follows:—(1) The Keith prize to Mr. R. C. Mossman for his work on the meteorology of the Antarctic regions, which originated with the important series of observations made by him during the voyage of the *Scotia* (1902–4), and has continued to the present time; (2) the Neill prize to Prof. W. H. Lang for his paper, in conjunction with Dr. R. Kidston, on *Rhynia Gwynne-Vaughani*, Kidston and Lang, published in the Transactions of the society, and for his previous investigations on Pteridophytes and Cycads.

AT the annual general meeting of the Institution of Civil Engineers held on April 23, Sir John A. F. Aspinall was elected president for the year 1918–19. The council of the institution has made the following awards for papers read and discussed during the session 1917–18:—Telford gold medals to Sir Robert R. Gales (India) and Mr. E. Sandeman (London); George Stephenson gold medals to the Hon. Sir Francis J. E. Spring and Mr. H. H. G. Mitchell (Madras); and Telford premiums to Mr. W. L. Lowe Brown (London), Mr. G. Blake Walker (Barnsley), and Mr. Alwyne Meade (Blackheath). Indian premiums also have been awarded to Sir Robert Gales and Sir Francis Spring.

THE Secretary of State for the Colonies has appointed a Committee to inquire into and report upon matters relating to research and development in the dependencies of the Falkland Islands, which include South Georgia, the South Shetlands, and Graham Land, with a view to the preservation of the existing whaling industry and the investigation of the economic and scientific possibilities of those regions. The members of the Committee are as follows:—Mr. P. C. Lyon, Department of Scientific and Industrial Research (chairman); Mr. J. O. Borley, Board of Agriculture and Fisheries; Mr. E. R. Darnley, Colonial Office; Dr S. F. Harmer, British Museum (Natural History), and Capt. C. V. Smith, R.N., Admiralty. Communications may be addressed to the secretary, Mr. H. T. Allen, Colonial Office, Downing Street, S.W.1.

THE Government is offering an award of 2000*l.* to the first person or persons who can obtain on or before August 1 next a fuel-oil deemed by the authorities to be suitable for Admiralty use by admixture of dehydrated coal-tar with mineral petroleum oils. The mineral petroleum oils to be employed must be in accordance with the Admiralty specifications for fuel-oil, and may be derived from the following sources:—U.S.A. Gulf fields, U.S.A. Northern fields, Mexico, Trinidad, Persia, Borneo, Burma, and the United Kingdom. The necessary samples of tars and mineral oils will be provided free of charge to responsible persons by the Government. All communications respecting the award should be addressed to the Controller, Munitions Mineral Oil Production Department, 8 Northumberland Avenue, W.C.2.

THE Australian Government has published a report (Bulletin No. 6) by its Advisory Committee of Science and Industry on alcohol fuel and engines. A previous report was noticed in NATURE of October 18 last. The present report, which is much fuller, gives the result of a considerable mass of experimental work. The numerous ways of obtaining alcohol from various vegetable products are discussed in relation to Australian climatic conditions. An excellent account is given of the effect on stationary internal-combustion engines of the proposed change of fuel; experiments to determine this were carried out in the engineering laboratory of Melbourne University. The main conclusions reached are that the world-supply of liquid mineral fuels is not sufficient to meet the world demand; enterprises for the production of mineral oils in Australia have not so far proved successful; no crops suitable for the production of alcohol are at present grown in Australia in sufficient quantity to meet existing local liquid-fuel requirements; the most suitable crops would be sorghum stalks, cassava, and sorghum grain; and experiments indicate that petrol at 40·5*d*. per gallon is equivalent to alcohol at 30*d*., so far as fuel costs per b.h.p. are concerned. The Committee decided to recommend that a Government subsidy be granted in order to encourage the proposed new industry.

MAJOR SYDNEY HAROLD BAKER, of the Gloucestershire Regiment, was killed in action on March 23, aged thirty-seven, and by his death natural science loses an earnest student and an experienced teacher. The son of Mr. James Baker, of Clifton, he was educated at Bristol Grammar School and Jesus College, Oxford, where he held an open scholarship. Graduating with honours in 1903, he continued his reading at Charlottenburg. After a short period at Loretto he became science master at Abingdon School, and entered upon the congenial task of developing his subject in new and handsome buildings. To this he devoted himself with much enthusiasm until the outbreak of war, when he offered himself for service. His promotion was rapid He became captain in February, 1915, intelligence officer in France in the following September, and major in Salonika in August, 1916. Invalided home early in 1917, after a senior course at Aldershot he was placed in temporary command of an entrenching battalion in France. Here he met his end, after holding a redoubt for thirty-six hours. Major Baker was a man of untiring energy, much personal attractiveness, and great range of interests and knowledge. Few men have combined more successfully the gifts of scientific and of literary training.

BY the death of Mr. Donald Salter, on March 22, from wounds received in action, meteorology has lost an earnest worker of great promise. Mr. Salter became a member of the staff of the British Rainfall Organisation in 1908 in his eighteenth year, and, until joining the Royal Engineers early in 1916 under the Derby scheme, was responsible as cartographer for the preparation of the numerous rainfall maps which appeared in the publications of the Organisation. He rendered invaluable assistance to Dr. Mill in the progressive development of the cartographic methods carried on at Camden Square, some of which he himself initiated. Mr. Salter was of an extremely modest and retiring disposition, with a charm of manner that greatly endeared him to his friends. A rapid and efficient worker, he invariably maintained that high standard of accuracy which is a tradition at Camden Square. He had marked artistic tastes, and devoted most of his leisure to their cultivation. After a brief period in the Ordnance Survey Department, Southampton, he saw active service in France until invalided home in October, 1916. Last year he obtained a commission in the Royal Garrison Artillery, and he was mortally wounded while carrying on the duties of section commander near his gun at the beginning of the recent great offensive by the Germans.

MR. ALFRED GORDON SALAMON, who died recently in his sixtieth year, will be remembered chiefly in connection with the chemistry of brewing, to which he made various original contributions. His main service to brewing, however, was rendered less by original research than by the interpretation and direction of the practical applications of chemical knowledge among brewers at a time when the art of brewing was only gradually emerging from conditions mainly empirical. Many members of the Royal Society of Arts will remember his Cantor lectures on yeast, which helped to make known in this country the classical work of Hansen, and he was successful as an early advocate of the use of raw grain as an adjunct to malt in the brewery. Mr. Salamon contributed to the Transactions of the Institute of Brewing (of which he was elected president in 1907) papers on this subject and on experiments in malting, and to the Journal of the Society of Chemical Industry papers on the influence of phosphates in fermenting worts and on the manufacture of caramel. He was joint author of a successful process of gas purification by the removal of sulphur by the use of "Weldon mud," and also of processes connected with the manufacture of cyanides; and he did some technical work in connection with the manufacture of artificial perfumes. He had at one time a large practice as a brewers' analyst and consultant, but during later years he devoted himself more to general technical chemistry, especially in its legal aspects. He possessed a keen forensic instinct, and his advice and help in unravelling chemical puzzles arising in connection with patent-law disputes were valued by leading members of the Bar who were more particularly connected with this branch of litigation. Mr. Salamon was for two years chairman of the London Section of the Society of Chemical Industry, in which he took a very active interest, as he also did in the Institute of Chemistry, of which he had for many years been, and was still up to his death, the honorary treasurer. He was popular in his profession, and will be mourned by a wide circle of chemical friends not only at home, but also on the Continent and in America.

SPRING this year has somewhat resembled that of last year, except that the early days of May this year have been much colder. The reports issued by the Meteorological Office show that the cold spells which have prevailed with such persistence in London have been common over the whole of the British Islands. March was, for the most part, dry, mild, and sunny; the mean temperature at Greenwich was 44°, which is 2° above the average, and 5° warmer than March, 1917. The mean temperature for April this year was 45°, which is 3° below the average, but 2° warmer than April last year. The warmest week since the commencement of spring is the week ending March 23, when at Greenwich the mean temperature was 48·2°, which is 5·4° above the average. The week with the greatest deficiency of temperature is the week ending April 20, when the mean was 40·4°, with a deficiency of 6·9°; during this week the rainfall at Greenwich measured 1·79 in., which is 0·2 in. more than the average for the whole month. In London, at Tulse Hill, in a Stevenson's screen, the maximum thermometer only rose to 60° or above on three days in April, and the highest temperature was 63°; whilst in March there were seven such warm days, and the highest temperature was 69°. April this year was peculiarly sunless, and this, coupled with the low temperature, kept vegetation throughout the month greatly at a standstill.

THE first of a series of articles descriptive of the machinery of the S.S. *Wulsty Castle* appears in *Engineering* for May 3. This, the first seagoing vessel fitted in this country with steam turbo-electric propelling machinery on the Ljungström system, ran her trials on the North-East Coast last week. In the Ljungström turbine the flow of the steam is radial, and the arrangement differs from other turbines, in which fixed and moving blades alternate, in that both sets of blades revolve in opposite directions. Hence a high relative speed can be obtained without excessive shaft speed. In this ship there are two turbo-alternators, each developing 625-kw. three-phase current at 650 volts, 60 cycles per second, at 3600 revolutions per minute. These supply current for two main induction motors, coupled to the single propeller shaft through double helical gearing. These motors are together capable of delivering 1500 shaft h.p. continuously at sea with a propeller speed of about 76 revolutions per minute, and also of driving the ship ahead or astern at full power. The auxiliary machinery is for the most part electrically driven. The boilers are fitted with Schmidt superheaters, and supply steam at a temperature of 625° F. The Ljungström turbine has been proved to have a high efficiency, and Sir William Beardmore has taken the initiative in this country in its marine applications.

IN Prof. H. C. H. Carpenter's presidential address to the Institute of Metals reference was made to the work of the Corrosion Research Committee, which is investigating the corrosion of brass marine condenser tubes by salt water. A laboratory specially designed and equipped for the work has been installed in the metallurgical department of the Royal School of Mines, and the experimental plant has been removed from Liverpool to the Southwick power station at Brighton, and is being run under strictly practical conditions. It has also been rendered possible for the committee to arrange that the problem should be attacked in the laboratory *ab initio* with pure metals corroding under the simplest conditions, and this should greatly enhance the value of the work being done. Prof. Carpenter also sketched in outline the most suitable educational course for the metallurgical engineer, and emphasised the point that the training cannot be wholly undertaken at a technical school or university. On completing his college course and entering works, it should be the function of the works to find out what special aptitudes the student possesses. He should have sufficient time to become acquainted with the practice of each of the operating departments, to find his feet, and to acquire the works atmosphere. A discerning management will have little difficulty in judging how best to utilise the services of such a man after this probationary period, during which he should be paid, at any rate, a living wage.

AN interesting article appears in the *Fortnightly Review* for May under the combined authorship of Mr. Claude Grahame-White and Mr. Harry Harper. The title is "Sovereignty of the Air and its Relation to Civil Aerial Transport," and the authors discuss the conditions which should be adopted for the regulation of air traffic after the war. Three plans are considered: the air may be completely free to all; it may be under the sovereignty of the country over which it lies; or a combination of these is possible by making the air free to all only above a specified altitude. It is pointed out that if war could be abolished by international consent, a free air would be the best solution. It is, however, fairly obvious that, for at any rate some years after the declaration of peace, the nations will be forced to take strong defensive measures in the air, and the only solution of the problem rendering this possible is a complete sovereignty of the air. The authors are of the opinion that commercial aeronautics will make great advances in the near future, and that the rapid inter-communication possible by the use of aircraft will do much to foster the development of friendly sentiments among the nations, and so to advance progress towards the goal of universal peace. They suggest also the desirability of a universal language to facilitate international relations in general, and this is certainly a point which cannot be overlooked. The whole question of international relations after the war is one of absorbing interest, and the article under discussion is worthy of perusal by those whose thoughts turn to the aeronautical side of such relations.

AT the annual general meeting of the Society of Glass Technology, held at Sheffield University on April 17, Mr. Frank Wood, the president, compared the position of the glass industry to-day with that before the war. Dealing with various sections, Mr. Wood said that the quality of British table and decorative ware is supreme, but owing to competition the output is almost negligible. Given three years' freedom of action, the position of the manufacturers would be unassailable. The plate- and window-glass trade is developing, and the outlook for optical glass is hopeful, but it is very necessary that the country should be rendered independent of foreign supplies of the latter; similarly with chemical glass, electric bulbs, and pressed ware, in which good progress has also been made. The production of bottles and jars—the largest section—is in a very healthy position, due to the introduction of new machinery. The president also stated that with united action amongst masters and men of all sections he has every confidence in the future of the industry. He then referred to the raw materials used by the industry, giving statistics and discussing the degrees of purity required, and concluding with some interesting remarks on devitrification. The contents of tank furnaces are subject to devitrification on a large scale; this is known as "dogging." A certain amount of "dog" serves to protect the tank-bottom, but in excess it gives rise to difficulties which seriously affect output. The formation of "dog" may be checked by increasing the proportion of alkali or of alumina in the batch. However, the addition of alkali, besides increasing the attack on the sides and roof of the tank, reduces the durability of the resultant glass, whereas the addition of alumina, with less attack on the tank, gives a more durable and tougher product.

IN response to the wishes of the American refrigeration industries, the Bureau of Standards at Washington has undertaken to redetermine the thermodynamic properties of ammonia, and three papers have recently appeared in the Bulletin of the Bureau, by Messrs. N. S. Osborne and M. S. Van Dusen, on the specific heat of liquid ammonia, on the heat which must be given to the liquid to keep its temperature constant when the pressure to which it is subjected is changed, and on the latent heat of vaporisation of the liquid. The heat in each case is supplied electrically, and the change of temperature measured by means of a platinum resistance thermometer. Under saturation conditions the specific heat of the liquid varies from 1·06 calories per gram at −40° C. to 1·10 at 0° C. and to 1·16 at 40° C. The heat measured in joules per gram, which must be abstracted from the liquid, when the pressure is increased by a kilogram per sq. cm. in order to keep the temperature constant varies from 0·06 at −40° C. to 0·09 at 0° C. and to 0·15 at 40° C. The latent heat of vaporisation in calories per gram varies from 332 at −40° C. to 302 at 0° C. and to 263 at 40° C. It is to be hoped that these results will soon be made available to refrigeration engineers in the form of a total heat-entropy chart.

A SIMPLE chart for the conversion of temperatures from the Fahrenheit to the Centigrade scale, or *vice versa,* has recently been issued by the Cambridge Scientific Instrument Co., Ltd. The device consists of the two scales side by side in the form of a spiral, and is printed on a card about 1 ft. square. The effective length of the scales is thus about 6 ft., thereby permitting the divisions, which correspond with 2° each, to be satisfactorily open without at the same time restricting the range. This covers from the absolute zero, −273° C., to 2000° C. Both the Fahrenheit and Centigrade scales are divided to 2° to prevent confusion, and each interval of 10°, 50°, and 100° is clearly marked to facilitate easy reading. The chart should prove of service to all users of pyrometers or other temperature-measuring instruments, as both scales are so generally employed that conversion from one to the other cannot in practice be avoided. In addition to the conversion chart, tables of useful thermometric data are given. The Cambridge Scientific Instrument Co. states that it will be pleased to forward a copy of this chart free of charge to anyone interested on receipt of six penny stamps to cover the cost of postage.

THE report of the National Union of Scientific Workers for the quarter ending March 25 last outlines the progress which has been made with the work of organisation of the society. Eight branches of the union have been definitely formed in various parts of the country, the prospective membership of which appears to be between 300 and 400. An organising sub-committee is being set up to deal with the London area, which, the report says, presents special difficulties. Among the aims of the union specified in the report is the maintenance of the freedom and independence of research. All inquiries respecting the work of the union should be addressed to the secretary, Mr. Norman Campbell, North Lodge, Queen's Road, Teddington.

A NEW series of books on industrial chemistry, edited by Dr. S. Rideal, is announced by Messrs. Baillière, Tindall, and Cox. It is intended to give in it a comprehensive survey of the chemical industries. Two volumes have just been issued. "Industrial Electrometallurgy," by Dr. E. K. Rideal, and "The Application of the Coal Tar Dyestuffs," by C. M. Whittaker, are in the press. Further volumes will deal with "The Industrial Gases," "Silica and the Silicates," "The Rare Earths and Metals," "The Iron Industry," "The Steel Industry," "Gas-works Products," "Animal Proteids," "Organic Medicinal Chemicals," "The Petroleum Industry," "Fats, Waxes, and Essential Oils," "Synthetic Dyes," "Wood and Cellulose," "The Carbohydrates," and "Rubber, Resins, Paints, and Varnishes."

THE April issue (No. 64) of Mr. C. Baker's Classified List of Second-hand Scientific Instruments has just reached us. In consequence of the increasing difficulty in obtaining new apparatus, it should be of especial interest and service to scientific workers. Copies can be had upon written application to 244 High Holborn, W.C.1.

MESSRS. DULAU AND CO., LTD., 37 Soho Square, W.1, have just issued a Catalogue (No. 72) of 764 books—some scarce—on botany and horticulture, anthropology, ethnology, archæology, scientific travel, etc. The list will doubtless be interesting to many readers of NATURE.

OUR ASTRONOMICAL COLUMN.

PHOTOGRAPHS OF THE SPECTRUM OF VENUS.—In a recent report to the Royal Astronomical Society (Monthly Notices, vol. lxxviii., p. 278) Mr. J. Evershed gives a preliminary account of some photographs of the spectrum of Venus which have been obtained with the large grating spectrograph at Kodaikanal. The primary purpose of the investigation was to ascertain whether the general shift of the lines towards the red at all points on the visible disc of the sun affects also a hemisphere turned 90° or more from the earth. If the wave-lengths in the light from Venus, after correction for the motion of the planet as a whole, are found to be identical with those from ordinary sunlight, the solar displacements cannot be attributed solely to motion of the absorbing gases; but if the Venus spectra show a smaller wave-length, a general motion of the solar vapours away from the earth may reasonably be inferred. Five good photographs, with iron arc comparisons, were obtained in October, 1917, which agree with a previous series of plates taken during February, 1917, in showing a distinctly smaller wave-length for iron lines in the spectrum of Venus as compared with the corresponding lines in the control spectrum of daylight. The results thus favour the motion interpretation of the solar shifts, involving an earth effect; but as the February plates were possibly not entirely free from pole effects in the arc, confirmatory evidence will be sought during June and July next. The trustworthiness of the plates for the purpose in view is indicated by the fact that the combined results from the east and west elongations yield a value for the solar parallax which differs only very slightly from that adopted in the Nautical Almanac. Only one plate was obtained when the planet was at half phase or less, but this is of special interest as showing a discrepant velocity, which is difficult to account for except by supposing that Venus rotates in the same direction as the earth and with the same order of velocity. It is further expected that the Venus plates will eventually decide whether the sun's gravitational field is concerned in the solar line-shifts or not.

RADIAL VELOCITIES BY OBJECTIVE PRISM.—The great advantages offered by the objective prism in the photography of stellar spectra have led to numerous attempts to utilise this instrument for the determination of radial velocities. The spectra of stars down to the tenth and eleventh magnitudes can be photographed in this way, and since a great number of spectra appear on a single plate, even an approximate method of deriving radial velocities would clearly be of great value in connection with the problems of stellar motions. One of the most promising methods appears to be that suggested by Prof. R. W. Wood, in which the light from the stars is passed through a filter of